

NOTES ON SOME INDIAN BIRDS.

BY

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VII.—HORNBILL.

(With 8 plates from photographs by the author).

(Continued from page 795 of Vol. XLII, No. 4).

The *New Fauna* recognises sixteen species of hornbills as occurring within Indian limits, including Burma and Ceylon. This is one more than the number described in Blanford's *Fauna*. The addition is not due to a new species having been discovered but because the Indo-Burmese pied hornbill of the *Old Fauna*, *Anthracoceros albirostris*, is now separated into two races, *Hydrocissa malabarica malabarica* Gmelin., the large Indian pied hornbill, and *H. m. leucogaster* Blyth, the Burmese pied hornbill. Only two of the total will be dealt with here in any detail, for the simple reason that I have no knowledge in the field of more than this number. The two species referred to are the northern (or common) grey hornbill, *Tockus birostris* (Scopoli) and the Malabar pied hornbill (*H. malabarica*). Both are widely distributed, the *New Fauna* stating that the common grey hornbill is to be met with 'from the base of the Himalayas throughout the better-wooded parts of the Indian Peninsula, except on the Malabar and Travancore Coasts; it does not occur in Sind, the Punjab and the greater part of Rajputana, but has been found on Mount Abu; it extends to Western Bengal and Bihar, but not to Eastern Bengal or Assam.'

Actually the grey hornbill has an even wider distribution as I have seen it near Ambala, and Dewar quotes several instances of the bird nesting at Lahore and elsewhere in the Punjab. In addition, Whistler records the species as being absent from the northern and western Punjab, from which we may, perhaps, be justified in inferring that the grey hornbill occurs more or less regularly, even if uncommonly, in the southern and eastern parts of that province. The Malabar pied hornbill, we are told, is to be found in

'Ceylon, Travancore, Bombay Presidency, Ratnagiri, Orissa, Bihar, and Central Provinces . . . It also occurs in Chota Nagpore and Western Bengal.'

Chota Nagpore is one of the divisions of Bihar and its mention in this manner shows once again that the author of the *New Fauna* was at times hazy as to geography. As in the case of the grey hornbill, the Malabar pied hornbill occurs more widely than the official account would have us believe—it is certainly met with in the south-eastern corner of the United Provinces where the Allahabad district borders on Rewa State, and in the southern area of the Mirzapur district, whence a skin was recently sent me with the intimation that the bird is not uncommon in suitable parts of the *sillah*.

The common grey hornbill is about two feet in length, and as its name implies, mostly grey in colour. The crown is dark grey, almost brown, with light grey bordering, most noticeable at close quarters. The wings too are brownish, as is the tail, which is long and graduated and tipped with white, with a dark brown sub-terminal band. The under parts are light grey, becoming almost white on the abdomen, the thighs, and under the tail. The bill and casque are blackish. This species differs from the majority of others of the *genus* in that it occurs not in deep forest but in open plains country, in *lopes* and avenues, and even in well-timbered compounds and round about villages. Indeed, as I remarked elsewhere¹, I found a grey hornbill's nest in a tree in Hume's old garden at Etawah, and knew of another in a hole of a *nim* tree in the very centre of a considerable *busti* in the Cawnpore district, a cavity which I was informed by the residents had been occupied by the birds for breeding purposes for several years.

The Malabar pied hornbill is a big bird—quite three feet in length. The head, neck, back, and wings, are black; so too are the two central tail feathers. The black is everywhere glossed with green. The remainder of the plumage is a pure white including the tips of the primaries and secondaries. There is a bare yellowish patch on the chin, and in the female a bare white ring round the eye. The bill is a waxy yellow, as is the base of the casque for one-third of its length. The remainder of the casque, which has a total length of eight inches, is black. Unlike the other larger representatives of the Family, this pied hornbill is not a denizen of deep, moist, ever-green jungles, but of deciduous forest, in hilly country. In many parts of Chota Nagpur it is by no means uncommon. There, during the winter months, when in camp in a suitable district, one can be almost sure of meeting with at least one party of Malabar pied hornbills every day. They may be feeding on a *banyan* or *pipal* tree, or we may be privileged to see them fly, one after the other, from one tree to another; and a beautiful picture the bird presents in its pied plumage as it makes its winged way with alternate flappings and glidings. The parties consist of from six to a dozen individuals and are most in evidence during the early morning and again in the evening.

As a family hornbills possess several peculiarities. All have eyelashes, an unusual feature in a bird's make-up. Most of them have the soft feathers absent under the wings, which makes their flight noisy. They nearly all have a casque or 'helmet'. In the larger species this is huge—I have already said that that of the Malabar pied hornbill is eight inches in length. What the use is of the casque is still a matter of conjecture; it is certainly not for the purpose of cracking nuts, as has been suggested, because there is nothing in the casque in which a nut could be cracked. Examination of a hornbill's head, however, shows that the casque is very light in weight; that only the outside is horn, the interior parts consisting of numerous fine bone-like sections with an even larger number of open cells in between. One obtains the impression that

¹ *Journal*, vol. XL., 409.



MALABAR PIED HORNBILL (female)

Hydrocissa malabarica malabarica.



MAIARAB DIED. NODDIE (1881) FEEDING HIS WIFE

the casque is a shock-absorber, though what shock it can take off the brain is not so clear. Hornbills do not chisel out holes in trees for nesting purposes; therefore there is no shock from such an operation for the casque to take up. Whether hornbills habitually prise open the hard stones of the fruit they eat, and if they do, whether this is done by holding the stone at the tip of the mandibles and cracking it, or by employing the heavy beak as a pickaxe, to break it, I am not competent to say. If the latter, then the necessity for a shock-absorber at once becomes apparent. My own observations, made from a female grey hornbill's *faeces* under a nest cavity, go to show that the stone of the *jamun* fruit is regularly thrown out unopened. These stones did not appear to have been voided. I never saw an opened stone. Hornbills, however, are most particular about cleaning their bills after they have fed the female inside the nest-hole. This they do by banging and scraping the bill against the side of a branch, repeatedly, and in what appears an unnecessarily rough manner. This banging might, in my view, cause injury to the brain but for the presence of the casque. But it is with regard to their nesting arrangements that hornbills differ from all other birds, thereby proving beyond all doubt that they are 'queer customers'. Speaking in general terms, the female hornbill, when the time comes for her to nest, enters a natural cavity in the trunk or a large branch of some tree, and there, without any further attempt at nest construction, proceeds to lay her egg or eggs. Her first egg laid, or even earlier, she sets about enclosing herself in the chamber by applying her droppings to the sides of the entrance hole until only a narrow vertical slit is left, through which the male feeds his wife regularly and devotedly until sometime after the young have hatched, whereafter she breaks down the side walls, these in the meanwhile having become so very hard that no natural enemy such as a monkey or cat can have access to her inside. During her self-imposed incarceration the female hornbill undergoes a moult of at least her wing and tail feathers, and is said to be in plump and excellent condition when she lets herself out, while the great effort of feeding first his mate and then his offspring over a period of weeks, reduces the male hornbill to a skeleton, to a shadow of his former self. After she has re-gained her liberty the female joins with her husband in feeding the young.

Here we might with advantage examine more critically the general statements made in the preceding paragraph. First, when does the female enter the nest-hole, and once she has commenced to lay, does she leave the nest before the eggs have hatched?

As with so many other questions which at once occur, there is not a great deal of evidence forthcoming, to settle the issue. Stuart Baker, writing of the Indian great hornbill, states that, as a rule, once the first egg is laid, the female does not make her exit until the young are well advanced. But, he adds, sometimes she continues to come out until the full clutch is laid. (The full clutch is one or two, and very rarely as many as three, but great irregularity occurs in laying). Dewar observes that the female common grey hornbill enters the nest before the eggs are laid and then leaves one to infer that she does not vacate it until after the

young have made their appearance. Horne (one of Hume's correspondents), writing of the same species, says of a female which he kept under observation that after she entered the nest-cavity on 29th April she did not leave it till 7th May, when he opened out the hole to take the eggs. My observations, made at three different nests of *T. birostris*, show that once the female enters the nest she does not leave it until after the eggs have hatched.

Weighing the evidence it may be that there is some variation regarding the matter among the different species.

Next, we ask ourselves, is it the female that encloses herself? or is this the work of the male? Or are both sexes responsible for the locking in of the female?

The *Old Fauna* states that the female, usually with the aid of the male, encloses herself, but adds that in some cases, e.g. *T. birostris*, the process of enclosure is performed by the female. Horne tells us he 'observed the female (common grey hornbill) working hard at enclosing the orifice with her own ordure'. Stuart Baker, describing the nesting habits of the Indian great hornbill, observes that the work of filling up the entrance is performed by the female, assisted sometimes, but not always by the male bird; and of the Assam brown-backed hornbill the same authority states that the work of plastering up the entrance hole is carried out principally by the female though at odd times the male adds a little to the plaster. Writing of hornbills generally, Whistler remarks that the female is believed to build up the plastering herself. Elsewhere, describing the nidification of the common grey hornbill, he states that the female spends the first two or three days in the nest-cavity in plastering up the entrance to the hole. Salim Ali tells us that the female grey hornbill imprisons herself. He adds that it is doubtful if the male assists her at all in this work. Writing of the same species, Dewar remarks that both the male and female work at enclosing the latter. I can only speak from personal knowledge of the common grey hornbill. In all three instances that came under my observation it was the female, and the female alone, who enclosed herself in the nest-cavity.

Here again, opinions or statements differ, but in the case of the common grey hornbill the bulk of the evidence indicates that the female alone is responsible for incarcerating herself.

What is the material employed for building in the female hornbill?

The *Old Fauna*, speaking generally of hornbills, says that the material employed is earth mixed with the bird's own droppings, but that in some cases, as with the common grey hornbill, the droppings alone are used. Horne watched a female of the same species enclose herself with her own ordure. Stuart Baker, referring to the nidification of the Indian great hornbill, observes that the droppings of the female are used, the seeds of fruit, and rotten wood, etc., which adhere to the droppings, being mixed with these. He adds that the male sometimes brings fresh clay-mud and his own droppings, though he considered this exceptional. Bingham, writing of *D. bicornis*, said that the material used for plastering up the nest-entrance was earth, leaf mould, and the bird's own droppings. Prater, discussing in *litt.* the wall from a nest of the same species sent to the



Common Grey Hornbill (male) feeding his wife. 'holding on to the bark by his claws' *vide* C. Horne in Hume's "Nests and Eggs of Indian Birds".



Malabar Pied Hornbill (female, white ring round the eye) at the nest hole.

Society, states 'it appeared to be made from chippings of bark, dung and some resinous matter.' Whistler, speaking in general terms, states that the material used is apparently the female's excrement, but in writing of the common grey hornbill says it is the female's own ordure, which is what Salim Ali also states is the case, though he qualifies this by saying that it is uncertain whether any material besides the female's excreta is used, and if this is so, how it is conveyed to the site. Dewar, describing the nest-construction of *T. birostris*, remarks that horse droppings, grass and the droppings of the birds themselves are used. Finally, there is the chemical analysis undertaken many decades since at Hume's instigation, of the plastering removed from the entrance to a nest-cavity of the rufous-necked hornbill. This showed that it consisted of nothing but the bird's own ordure, there being no evidence of the presence of clay or mineral matter of any kind.

From a distance of only ten feet I have watched from a *machan* a female common grey hornbill applying material to the entrance walls of her nest. At the time I was convinced that this was the bird's droppings. Now, however, I am not so certain. In every instance the material employed was brought from the floor of the nest and in appearance was similar to the excreta thrown out below the nest. The beak was used as a trowel when applying the stuff to the entrance walls, much laying of the plaster taking place before the bird was satisfied with her handiwork. This done she spent some time cleaning her beak thoroughly, judging by the manner in which she banged and scraped it against the interior of the chamber. I now understand it is not possible to distinguish in the plastering between a hornbill's 'cast' and the bird's dung unless a proper chemical examination is made. This being the case, the possibility cannot at present be ruled out that what I took to be droppings were in fact 'casts'. Some plastering which I recently removed from the entrance to the nest of a *T. birostris* and which I have forwarded to the Society for chemical analysis should help to elucidate this point¹. In the event of this showing that the plaster was formed from 'casts' further research will not improbably indicate that the binding agent is the female's saliva. Here it will not be out of place to mention that only twice during many days vigil at a hornbill's nest have I known the female place her vent against the nest-entrance in order to defecate outside direct. At all other times the dung was brought from the floor of the nest, held at the tip of the bill, and then thrown out.

In what form is food supplied by the male hornbill to his imprisoned wife? Writing of the small pied hornbill, Bingham, who watched the process, states that the male fed the female by 'putting single berries one after another into the tip of her bill which was shoved out of the slit; after receipt of each berry she withdrew her beak, apparently to swallow the food'. It will be observed that mention is not made of where the food lodged with the male prior to his parting with it—did he arrive with a number of berries held in his bill, visible to the naked eye? or were they stowed away in

¹ See page 401.

the crop, to be brought up one at a time? Horne, who watched a common grey hornbill feed his mate in the nest, observed much the same thing and is equally helpful in the matter of the stowing of the food prior to it being given to the female. R. Thompson (another of Hume's correspondents), who saw numbers of nests of *D. bicornis*, tells us that he often saw the male come with his throat full of berries to feed the female. Whistler, describing the nesting habits of *T. birostris*, observes that the male brings the food held in his beak. Salim Ali, unexpectedly, begs the question by being content to remark that the male common grey hornbill takes his mate 'banyan and pipal figs varied occasionally by a lizard or some other tit-bit'. Humayun Abdulali, who watched a Malabar grey hornbill feeding the imprisoned female, tells us this was done by regurgitating berries, a slow and apparently somewhat difficult process. On another occasion the same bird brought a dragon fly. This was held in the beak but owing to the bird taking fright was not made over to the female. On the male being shot about twenty-five berries of *Ixora* sp. were found in the gullet, ten more having spilled out as the bird fell. In the stomach were the remains and seeds of forty more berries. Humayun Abdulali goes on to say that 'there was no trace of any covering to form packets of seeds, as has been suggested by other observers', and quotes Br. Navarro as stating that the male when taking food 'taps at the entrance and awaits patiently the female's consent to be fed. Considerable waits are involved, but the tapping continues'.

I have spent many hours at a number of nests watching the common grey hornbill feed his mate. In not one single instance was food, intended for the female, visible in the beak; not even when this took the form of a bloodsucker lizard (*girgit*) or a dove's egg. Always the food was brought up from the gullet, one fig or berry at a time, which, held at the tip of the bill, was made over to the female whose bill-point protruded through the narrow vertical slit to receive the food. As she received the fig or berry (or other tit-bit) she invariably gave a squeal of delight and withdrew her beak into the nest-hole. Having delivered one berry, the male threw his head back and then forward, the beak open the while, this action (except in rare instances) producing another berry which was caught and held at the tip of the bill and delivered in the same way as before to his wife, who never, in my experience, delayed in at once taking whatever was passed over to her. I have seen as many as twenty-four pipal figs and a crumpled up green leaf made over in this manner to the female at one 'sitting'. Another *T. birostris* gave his wife twenty-two nim berries during one visit to the nest. The diet is sometimes varied with meat and I remember this same bird (I photographed him at the nest during four successive years) bringing up from his crop a young nestling, very pot-bellied, which was received with loud acclamation by his Other Half. Another day he twice gave her a bloodsucker lizard, and during a locust plague presented her with seven locusts, all brought up, one after the other, from the gullet. Many of their feet, and in some cases the wings, were missing. This male grey hornbill was a bird of parts and once, after an absence of nearly three hours



The 'Olive Branch'.



The next berry is coming up.



The berry reaches the tip of the bill.



More usually the male fed his wife in this manner.

THE COMMON GREY HORNBILL



The male throws his head back, then forward, the beak open the while, this action (except in rare instances) producing another berry.

from the nest, what time the female frequently gave tongue, suddenly produced a small twig from his maw—the *olive branch*, as a friend has suggested it was. He had nothing else to give his wife this visit, but even this was gladly accepted. Yet another common grey hornbill that I watched very recently at the nest (10-5-1942) first brought up from his internal economy a feather, which the female apparently had some difficulty in taking over as he had to present it five times before it was finally disposed of; then he threw his head back, and again forward. This he repeated three times before he was able to regurgitate anything. It turned out to be a slim green pod, about three inches long, and looked like some species of bean. Two more such beans were given on the occasion of this visit. In each instance the bird experienced difficulty in 'delivering the goods'. When making over the last of these to his spouse, her beak and the bean did not make proper contact, with the result that the bean fell down. The male, however, recovered it before it reached the ground only fifteen feet below—a remarkably agile performance on his part. On another occasion this grey hornbill gave his wife two *large* figs and, finally, what I took to be a tamarind pod. Again he had difficulty in bringing these up. At this nest too the female tendered her thanks by uttering a short, happy squeal each time she received something from her husband.

During a fourteen-hour watch which I and my *shikari* kept over a common grey hornbill's nest one day the male fed his wife on twelve occasions. There were then small young in the nest. Between 5 a.m. and 9 a.m. he fed her approximately every hour. Thereafter, till mid-day, he visited the nest but twice. Followed an absence for two hours; then he fed the female at 3-15, 4-25, 5-15 and 6-5 p.m.

At this point it may be of advantage to return to the subject of 'casts' and 'seeds in packets'. A cast, as the term is generally understood, is a ball or pellet of bones, fruit-stones and other such matter which a bird has failed to defecate, and which it has voided *via* the beak. I can find no reference to Indian hornbill casts in the literature at my disposal. I have also never come across a hornbill's cast in a nest, nor seen one on the ground amongst the birds' droppings, in spite of constant search; nor has anybody whom I have consulted in the matter. Why then, it may well be asked, am I so insistent on discussing the matter of hornbill casts? The answer is because I have stated I am not now certain that the material employed in walling up the entrance to a common grey hornbill's nest, or for that matter the nest of any others of the Family, may not, on chemical analysis, in part at least, prove to be composed of material cast by the bird or birds. This possibility I have put forward on the evidence recorded by Moreau on the breeding habits of African hornbills. He reports that in the case of a pair of trumpeter hornbills which attempted to breed in the Zoological Gardens in London the wall-plaster was fabricated from materials consisting of pellets regurgitated by the male 'although each consignment was "topped off" with a lump of moist clay carried in his bill'. He further reports that the masonry at the nest of another species of hornbill—a perfectly wild pair in this instance—